

**AMENDMENTS TO THE CLAIMS**

This listing of claims will replace all prior versions, and listings, of the claims in the application:

**Listing of Claims:**

1-58. (canceled)

59. (new) A non-naturally occurring polynucleotide encoding a fusion protein which comprises:

an S4-S5 cytoplasmic loop of an ion channel; and

a DNA-binding or transcription activation domain of a transcriptional activator,

wherein said S4-S5 cytoplasmic loop comprises SEQ ID NO:1 and is an S4-S5 cytoplasmic loop of an  $\alpha$ -subunit of a potassium channel, and wherein said potassium channel is selected from the group consisting of Kv1.1, Kv1.2, Kv1.3, Kv1.4, Kv1.5, Kv1.6, and Kv3.4.

60. (new) A non-naturally occurring polynucleotide encoding a fusion protein which comprises:

an S4-S5 cytoplasmic loop of an ion channel; and

a DNA-binding or transcription activation domain of a transcriptional activator,

wherein said S4-S5 cytoplasmic loop comprises SEQ ID NO:2 and is an S4-S5 cytoplasmic loop of an  $\alpha$ -subunit of a potassium channel, and wherein said potassium channel is selected from the group consisting of Kv1.1, Kv1.2, Kv1.3, Kv1.4, Kv1.5, Kv1.6, and Kv3.4.

61. (new) A non-naturally occurring polynucleotide encoding a fusion protein which comprises:

an amino-terminal inactivation region of an ion channel; and

a DNA-binding or transcription activation domain of a transcriptional activator,

wherein said amino-terminal inactivation region comprises SEQ ID NO:5 and is an amino-terminal inactivation region of a potassium channel  $\alpha$ - or  $\beta$ -subunit, and wherein said potassium channel  $\alpha$ - or  $\beta$ -subunit is selected from the group consisting of Kv $\beta$ 1, Kv $\beta$ 1.2, Kv $\beta$ 1.3, Kv $\beta$ 3, Kv3.4, and Kv1.4.

62. (new) A non-naturally occurring polynucleotide encoding a fusion protein which comprises:

an amino-terminal inactivation region of an ion channel; and

a DNA-binding or transcription activation domain of a transcriptional activator,

wherein said amino-terminal inactivation region comprises SEQ ID NO:6 and is an amino-terminal inactivation region of a potassium channel  $\alpha$ - or  $\beta$ -subunit, and wherein said potassium channel  $\alpha$ - or  $\beta$ -subunit is selected from the group consisting of Kv $\beta$ 1, Kv $\beta$ 1.2, Kv $\beta$ 1.3, Kv $\beta$ 3, Kv3.4, and Kv1.4.